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THE SUPPLY AND DEMAND OUTLOOK FOR PHOSPHORIC ACID IN FERTILIZERS*

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SUMMARY

The paper reviews past trends and assesses the future outlook of the supply/demand balance of phosphoric acid on the global scale. It presents also regional statistical data and projections on the production of phosphoric acid for fertilizer, consumption forecasts for phosphate fertilizer in general, and provides data on the development of the production potential for phosphoric acid between 1982/83 and 1987/88.

The paper explains the methodology used by the International Fertilizer Industry Association (IFA) for correlating data on phosphoric acid and phosphate fertilizer, and presents an extensive critical assessment of the results which take into account pertinent forecasts made by IFA member companies.

The overall conclusion of the paper reveals a continuing surplus of the phosphoric acid supply potential till 1987/88, the last year under review. However, the critical assessment of the factors which have a bearing on past and present trends gives to understand that the development of demand for phosphates as well as the world market pricing situation remain uncertain because many external factors which are beyond the industries' reach are difficult to predict.

Forecasts some five years ahead, of the supply/demand balances for nitrogen, phosphate and potash fertilizers, are made annually by the World Bank/FAO/UNIDO Fertilizer Working Group. This group is composed of representatives of the international organisations in question and experts from the fertilizer industry.

Although IFA has dealt, since 1980, with all the fertilizer nutrients without discrimination, for historical reasons IFA's principal contribution to the Group has been on phosphate fertilizers. A considerable amount of information is assembled by the Secretariat, from IFA members, for this purpose (it is also made available to all IFA members in various documents).

This paper will therefore deal with information resulting from our own work i.e. on the phosphate fertilizer balance.

The method used by IFA to assess the phosphate fertilizer balances differs from that of the World Bank/FAO/UNIDO Fertilizer Working Group in that it aims to establish the supply/demand balance for phosphoric acid, rather than phosphate fertilizers as a whole, in order to avoid various complications - such as the difficulty of assessing the production potential of the non-H_3PO_4 P_2O_5. However the end result is normally similar.

1. The Supply/Demand Balance for Phosphate Fertilizers ; the IFA Survey

IFA surveys on the supply and demand outlook for phosphoric acid for fertilizers have been carried out annually since 1973. The object of the exercise is to forecast the demand for phosphoric acid in fertilizers, the potential supply of phosphoric acid for use in fertilizers and hence, by difference, the balance. For this purpose IFA members are asked to provide information on the present and projected phosphoric acid plants in their countries and for their forecasts of fertilizer consumption. The forecast relates to a period some three years ahead i.e. 1987/88-1988 in the case of the 1985 survey. The base year of the 1985 survey (i.e. the most recent year for which complete and reliable statistics are available) was 1982/83-1983.

1.1. The phosphoric acid component of phosphate fertilizers

The validity of the IFA method depends on the predominance of phosphoric acid in the development of the use of phosphate fertilizers. This can be seen from table 1.

On a world basis i.e. including the centrally planned economies, the quantity of non-H_3PO_4 P_2O_5 consumed in fertilizers has remained fairly constant, increasing from 13.9 to 14.2 million tonnes between 1974 and 1983, but falling as a proportion of total P_2O_5, from 53 % to 45 %.

Some analysts suggest that, in view of the high sulphur prices and the cost/price squeeze on farmers due to low agricultural commodity prices, there will be a tendancy to use less sophisticated fertilizers, such as ground rock, partially acidulated phosphate and single superphosphate. It is true that a number of new single superphosphate plants are coming into operation in India - in fact 30 new plants by 1990 - and that, thanks to the efforts of IFDC, more coun-

tries are likely to make use of their phosphate resources in the form of ground or partially acidulated rock for local consumption. Even in France, the use of ground rock in PK binaries appears to be increasing. But overall the recent trend is likely to continue and the returns from IFA members indicate that the proportion on non-H3P04 P205 will fall, in the Western World, to 29 % in 1988. The evidence at present is that the major consuming countries will continue to rely on concentrated, high quality and often multi-nutrient fertilizers.

TABLE 1

Phosphoric Acid in Phosphate Fertilizer Consumption

Western World

1000 tonnes P205

Year	Total P205 Consumption	of which H3P04	non H3P04	non H3P04 as % of total
1972	15401	8495	6906	45 %
1973	17077	9462	7615	45 %
1974	17727	10123	7604	43 %
1975	15343	9011	6332	41 %
1976	17805	10194	7611	43 %
1977	18342	11579	6763	37 %
1978	19664	11569	8095	41 %
1979	20196	12974	7222	36 %
1980	20879	13456	7423	36 %
1981	19592	12933	6659	34 %
1982	19063	12701	6362	33 %
1983	18123	12212	5911	33 %

Source : IFA Annual surveys.

1.2. Forecasts of Phosphate Fertilizer Consumption

The forecasts based on information given by IFA members in April 1985 for the 1985 survey are given in table 2.

TABLE 2

Forecasts of Phosphate Fertilizer Consumption

1000 tonnes P205

Region	1983/84 1983	1984/85 1984 (% change)	1987/88 1987 (% change per annum
West Europe	5216	5295 (+ 2%)	5256 (=)
North America	5182	5020 (- 3%)	5580 (+ 4%)
Latin America	1813	2344 (+ 29%)	2655 (+ 4%)
Oceania	1096	1159 (+ 6%)	1135 (- 1%)
Africa	927	965 (- 4%)	1215 (+ 8%)
Near East	1480	1464 (- 1%)	1847 (+ 8%)
South Asia	1840	2012 (+ 9%)	2776 (+ 11%)
East Asia	1726	1794 (+ 4%)	2026 (+ 4%)
Total Western World	19280	20053 (+ 4%)	22490 (+ 4%)
East Europe	9798	10110 (+ 3%)	10830 (+ 3%)
Socialist Asia	3848	3780 (- 2%)	4771 (+ 8%)
TOTAL WORLD	32927	33943 (+ 3%)	38091 (+ 4%)

1.3. The Supply of Phosphoric Acid

Table 3 gives our estimates of H3P04 production for fertilizer use in the base year of the survey, the anticipated increased in production capability between the base year and the forecast year and, by adding the two, the estimated production potential in the forecast year.

TABLE 3

Calculation of the Potential Production of Phosphoric Acid for Fertilizers

1000 tonnes P205

Region	Calculated H3P04 production for use in ferts 1982/83 - 1983	Additional capacity (phased) 1982/83.86/87	Potential H3P04 production 1987/88	Announced H3P04 name-plate capacity 1987/88
West Europe	2316	+ 44	2579	4070
East Europe	4025	+ 1829	5854	8284
North America	9850	+ 594	10444	12226
Latin America	744	+ 351	1095	1599
Oceania	140	+ 14	154	285
North Africa	2150	+ 1184	3334	4435
Other Africa	412	+ 190	1037	1278
Near East	457	+ 631	1227	1896
South Asia	470	+ 27	497	841
East Asia	707	+ 432	1139	1725
Socialist Asia	28	0	28	51
WORLD	21299	+ 5296	27388	36690

Allowance is made in the 1982/83 estimates for the under-utilisation of capacities in that year, in certain countries. The new capacities are "phased in" i.e. allowance is made for working up to full production over two or three years, depending on the country. In certain developed countries some small, old plants have been permanently closed but these closures have not been deducted since the remaining capacities are sufficient to achieve the potential production figure. Plants which are closed temporarily or "idle" are not deducted since they can restart as soon as economic conditions permit ; at present there are several plants in the U.S. which are idle or running at low rates. The difference between the total name-plate capacity and the potential production figure is due to the chronic under-utilisation of capacity in certain countries and to production for non fertilizer use (wet acid production for non-fertilizer use amounts to about 2 million tonnes P205 per year).

1.4. The Forecasted Demand for Phosphoric Acid for Fertilizer Use

In order to forecast the demand for phosphoric acid in fertilizers in the forecast year (1987/88), we asked IFA members to provide forecasts of their phosphate fertilizer consumption, with product detail, for the year in question. From this information, completed as necessary by Secretariat estimates, we calculated the phosphoric acid content. For example, no phosphoric acid is used in the manufacture of single superphosphate, whereas all the P205 in the ammonium phosphates is derived from phosphoric acid. In the case of complex fertilizers we use different factors, according to the country. An allowance of 5 % is made for losses in conversion from phosphoric acid to the finished fertilizer. The results of the 1985 survey are given in table 4.

1.5. The Balance

The balance for a given region is obtained by subtracting the forecasted demand from potential production, as is shown in the following table :

TABLE 4

Forecasted Balance of Phosphoric Acid for Fertilizers

in 1987/88

1000 tonnes P205

Region	Potential H3P04 Production	Forecasted H3P04 Consumption	Balance
West Europe	2579	3247	- 668
East Europe	5854	6662	- 808
North America	10444	5419	+ 5025
Latin America	1095	1886	- 791
Oceania	154	259	- 105
North Africa	3334	248	+ 3086
Other Africa	1037	583	+ 454
Near East	1227	1671	- 444
South Asia	497	2249	- 1752
East Asia	1139	1486	- 347
Socialist Asia	28	1236	- 1208
WORLD	27386	24946	+ 2442

It is clear from the methodology described above that the figures relate to phosphoric acid in all its forms. The international trade may be in the form of liquid phosphoric acid or solids such as the ammonium phosphates ; to a large extent the choice is determined by the market.

The results illustrate the evident importance of North America and North West Africa as suppliers of the world market and Asia (especially South Asia and Socialist Asia), Europe (East and West) and Latin America as the import markets.

The world balance indicates that the existing and new phosphoric acid capacities are more than sufficient to supply the estimated demand in 1987/88.

1.6. A Critical Assessment of the Results

At first sight the results indicate very clearly a continuing surplus in the phosphate market, but there are in fact many uncertainties. For example :

On the one hand

. the surplus (balance as a proportion of consumption) is only 10 % and some surplus is necessary in any case for the smooth functioning of the market,
. the development of production in the new producing countries will undoubtedly encounter more difficult problems than in countries with a long-established industrial infrastructure.
. the centrally planned countries could import more than the balances indicate ; the agricultures of China and the USSR in particular need considerably more phosphate than is applied at present,
. for the first time, there are signs that some larger plants may close permanently ; to date closures have tended to concern small, old plants and have had little impact on production capability,
. current international prices of processed phosphates on the international market are below total production cost and hence are not conducive to new investment,
. very little additional capacity is due to come into operation during the period in question in the major importing countries of Brazil, China, India and Turkey,
. an improvement in the economic position of developing countries could have a large impact on the demand for fertilizers and agricultural products, just as their economic difficulties have been the major cause of depression of recent years.

On the other hand

. the demand forecasts are probably optimistic. The agricultural situation has deteriorated since the forecasts were made (in the sense that generally good 1985 harvests will exacerbate the surplus problem). But each important producer assumes that it will maintain or increase its share of the world market.
. if fertilizer prices were to rise significantly it is probable that some plants could produce more than we have assumed (note the large difference shown in table (3) between name-plate capacity and the estimate of potential production).

This is the 12th consecutive annual survey carried out by IFA and each survey has shown a phosphoric acid surplus of the same order (about 2 million tonnes P205). The demand forecasts have generally proved optimistic but so have the supply forecasts and the balance has turned out about right. However, this consistency has not prevented the present over-supply situation. As always, IFA makes the detailed information resulting from the surveys available to members and it is up to each producer to adjust the results and interpret them as he thinks best. However, the set-back to consumption which occurred between 1980 and 1983 could not have been anticipated and is a major cause of the present over-supply situation. Additional capacity continued to be constructed during this period, especially by producers wishing to add value to their rock resources. There was not, however, the kind of excessive investment which occurred around 1974 (and which investigated the introduction of the IFA surveys).

In fact, it does seem that some heed is being paid to the balance estimates (the results of the UNIDO/FAO/World Bank Fertilizer Group assessments are similar to our own). Weighing up all the factors mentioned above, the situation towards the end of the 1980s may not be as bad as it seems at the moment, especially if there is an improvement in the economies of the developing countries.